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Laser annealing of dielectrics with metal nanoparticles

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Abstract

The effect of nanosecond excimer laser pulses on a composite layer of sodium-calcium silicate glass with silver nanoparticles has been investigated. Nanoparticles were synthesized by ion implantation. Based on measuring the optical absorption and reflection spectra of the composite layers, it is found that an increase in the number of laser pulses leads to a monotonic decrease in the size of silver nanoparticles. However, laser irradiation with a longer duration leads to the growth of nanoparticles with their subsequent destruction. The effects observed are discussed in terms of heating a glass composite layer as a result of the effective absorption of laser radiation. © 2011 Pleiades Publishing, Ltd.

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